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1           18.     A method of producing a semiconductor film, comprising:  
2           providing a substrate; and  
3           depositing a graded gallium nitride layer on the substrate having a varying  
4           composition of a substantially continuous grade from an initial composition to a final  
5           composition formed from a supply of at least one precursor in a growth chamber without any  
6           interruption in the supply.

1           19.     The method of claim 18, wherein the step of depositing the graded gallium  
2           nitride layer comprises using metalorganic chemical vapor deposition (MOCVD).

1           20.     The method of claim 18, wherein the step of depositing the graded gallium  
2           nitride layer produces a graded gallium nitride layer having a net compressive stress.

1           21.     The method of claim 18, wherein the step of depositing the graded gallium  
2           nitride layer comprises changing a vapor pressure of the supply of at least one precursor in a  
3           growth chamber for the graded gallium nitride layer.

1           22.     The method of claim 18, wherein the precursor is gallium, aluminum or  
2           nitrogen.

1           23.     The method of claim 18, wherein the step of depositing the graded gallium  
2           nitride layer comprises changing a parameter of the growth chamber for the graded gallium  
3           nitride layer.

1           24.     The method of claim 23, wherein the parameter of the growth chamber is a  
2           total pressure, a temperature of the substrate, a total flow, a rate of substrate rotation or a  
3           reactor wall temperature.

1           25.     The method of claim 18, wherein the step of depositing the graded gallium  
2           nitride layer comprises changing the geometry of the growth chamber for the graded gallium  
3           nitride layer.

1           26.     The method of claim 25, wherein changing the geometry of the growth  
2           chamber comprises moving the substrate relative to injectors of the growth chamber.

1 27. The method of claim 18, wherein the substrate is silicon or silicon carbide.

1 28. The method of claim 18, wherein the initial composition is a high aluminum  
2 composition.

1 29. The method of claim 18, wherein the initial composition is aluminum nitride  
2 or a high aluminum content aluminum gallium nitride.

1 30. The method of claim 18, wherein the final composition is a low aluminum  
2 composition.

1 31. The method of claim 18, wherein the final composition is gallium nitride or a  
2 low aluminum content aluminum gallium nitride.

1 32. The method of claim 18, further comprising depositing at least one additional  
2 layer on the graded gallium nitride layer.

1 33. The method of claim 18, wherein the step of forming the graded gallium  
2 nitride layer comprises introducing at least one other element into the growth chamber for the  
3 graded gallium nitride layer causing no abrupt variations in the varying composition of the  
4 graded gallium nitride layer.

1 34. The method of claim 33, wherein the other element is silicon, indium or  
2 arsenic.

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